

Application No.: 10/526,713  
Filing Date: 9/23/2005

### REMARKS

Claims 1, 20, and 24 have been canceled. No new claims have been added.

Claims 2-19, 21-23, and 25-39 are amended. These amendments are fully supported by the original claims and the specification as originally filed, for example for the purposes of illustration only, and not by means of any limitation, at paragraph [0194] ("the actuators of each movement facilitation device remain completely independent of one another"); at paragraph [0374] ("system is designed to move individual joints of the hand independently"); and at paragraph [0406] ("This structure allows telescopic and independent activation of all joints"). As such, no new matter has been added.

Pending Claims 2-19, 21-23, and 25-39 are currently presented for examination.

Applicant thanks the Examiner for her review of the instant application. After having carefully considered the Office Action dated August 23, 2007, Applicant respectfully traverses the Examiner's claim rejections.

#### Claim Objections

The Examiner has objected to Claim 13 as lacking antecedent basis. Applicant thanks the Examiner for suggesting changes to the claim language to overcome the objection. Applicant has made amendments to Claim 13 in conformity with the suggestions by the Examiner.

#### Rejections Under 35 U.S.C. § 102

The Examiner rejects Claims 1-5, 8, 9, 17, 19, 20-24, and 26-29 under 35 U.S.C. 102(e) as being anticipated by Mavroidis et al. (US 6,379,393, hereinafter Mavroidis). The Examiner states that Mavroidis discloses a movement facilitation device that can be used for passive motion therapy.

Claim 1 has been canceled, rendering its rejection moot.

Applicant has amended independent Claims 2, 27 and 28, upon which Claims 3-5, 8, 9, 17, 19, 20-24, 26, and 29 are dependent thereon, to positively recite the limitation wherein "the first movement facilitation device being disposed so as to facilitate a first movement of a corresponding first joint of said limb or digit, the second movement facilitation device being disposed so as to facilitate a second movement of a corresponding second joint of said limb or

Application No.: 10/526,713  
Filing Date: 9/23/2005

digit, wherein the first movement can be performed independently of the second movement" (emphasis added). The combination of these characteristics is not present in Mavroidis.

Mavroidis describes a variety of prosthetic devices and orthoses. The prosthetic devices are designed to replace parts of the body, whereas the orthoses are intended to facilitate movement of parts of the body. Whereas Mavroidis describes, *inter alia*, prosthetic devices having multiple joints, all of the orthoses described by Mavroidis are capable of facilitating movement of only a single joint.

The above referenced claims of the present application are directed to movement devices capable of facilitating independent movement of at least two different joints of limb or a digit of a patient. Facilitating independent movement of more than one joint, with minimal impedance to movements of those joints, presents significant technical challenges, which are addressed by certain embodiments of the present invention. Mavroidis, by contrast, fails to describe orthoses having multiple joints, and consequently fails to address the technical challenges associated therewith. Each of the presently amended above referenced claims incorporate this feature.

The Examiner has stated, regarding claims 20 and 21, that Mavroidis discloses a plurality of movement facilitation devices that can be independently controlled, referring to column 5, line 60 to column 6, line 5 of Mavroidis. Applicant respectfully submits that the independence of the movement of different joints, which has now been included in all claims, is not anticipated by Mavroidis. Mavroidis describes "several plurality of smart wires can be "bundled". (Column 5, lines 64-65). Mavroidis continues that these may be "further divided into different sets, each of which is independently controlled". (Column 6, lines 1-2). However, there is no disclosure of applying the independent control to different joints so as to control the different joints independently. Figure 1 of Mavroidis, which depicts the muscle fibre bundle construction described at column 5, line 60 to column 6, line 5, clearly shows separate bundles of fibres. But this figure equally clearly is not applicable to controlling separate joints independently.

Because of this, Applicant respectfully submits that Mavroidis does not teach every element of presently amended independent Claims 2, 27 and 28, and Claims 3-5, 8, 9, 17, 19, 20-24, 26, and 29 dependent thereon. Accordingly, Mavroidis does not anticipate the inventions defined by these claims.

Application No.: 10/526,713  
Filing Date: 9/23/2005

The Examiner has rejected Claims 1-4, 6-8, 10-12, 20-25 and 27-29 under 35 U.S.C. 102(e) as being anticipated by Cencer (US 6,312,398, hereinafter "Cencer"). Examiner states that Cencer discloses a movement facilitation device comprising an actuator, an operating means, a controller, a power source, and a support structure in the form of a glove.

Claim 1 has been canceled, rendering its rejection moot.

Applicant has amended independent Claims 2, 27 and 28, upon which Claims 3-4, 6-8, 10-12, 20-25, 25-26, and 29 are dependent thereon, to positively recite a limitation wherein "the first movement facilitation device being disposed so as to facilitate a first movement of a corresponding first joint of said limb or digit, the second movement facilitation device being disposed so as to facilitate a second movement of a corresponding second joint of said limb or digit, wherein the first movement can be performed independently of the second movement" (emphasis added). The combination of these characteristics is not present in Cencer.

Cencer fails to disclose this feature, in that all joints of a single digit of Cencer must operate in the same manner simultaneously. This is made clear in Fig. 3 of Cencer. Column 6, lines 40-55 of Cencer, referred to by the Examiner, provides for multiple actuators operating on a single resilient joint, but it fails to disclose multiple actuators or movement facilitation devices operating independently on different joints in a single digit. As noted above, independent facilitation of multiple joints in a single digit presents significant challenges, which are addressed by certain embodiments of the present invention, but are not by Cencer.

Because of this, Applicant respectfully submits that Cencer does not teach every element of presently amended independent Claims 2, 27 and 28, and Claims 3-4, 6-8, 10-12, 20-25, 25-26, and 29 dependent thereon. Accordingly, Cencer does not anticipate the inventions defined by these claims.

The Examiner has rejected Claim 39 under 35 U.S.C. 102(e) as being anticipated by Kinnunen et al. (US 6,619,134, hereinafter "Kinnunen"). Examiner states that Kinnunen discloses a force position sensor comprising a light source, a detector means, and a return mechanism (2) for measuring forces and displacements.

Applicant has amended Claim 39 to positively recite the limitation "wherein at least one of the detectors is free to move relative to the radiation source" (emphasis added). Reference is

Application No.: 10/526,713  
Filing Date: 9/23/2005

made, for example, to FIG. 42 of the instant application, for the purposes of illustration only, and not by means of any limitation. FIG. 42 shows a single radiation source and two floating detectors attached with cables. In certain embodiments, the detectors can move relative to the radiation source so as to provide force-position information. See, for example, the force-position transducer described in paragraphs [0412] – [0415]. Advantageously, as a result of this movable configuration, in certain embodiments of the present invention, the transducer is capable of measuring the position of a joint and of a force applied by or on the joint as separate independent parameters.

Applicant respectfully submits that Kinnunen does not teach a transducer, wherein a detector is free to move relative to a radiation source. By contrast, Fig. 1 of Kinnunen shows a radiation source (4) at a fixed distance from detector (5). See also column 1, lines 52-53. Kinnunen column 4, lines 7-9 indicate that variation in the position of the shading means (which correlates to position or force information) provides any variation in intensity reaching the detector, rather than varying intensity by varying the distance of the detector from the radiation source as in certain embodiments of the present invention. Kinnunen is therefore capable of measuring position or force: position is measured directly (by movement of the shading device and consequent changes of radiation position and/or intensity received by the detector) and force indirectly (by combination of position information with the known force constant of the spring).

Because of this, Applicant respectfully submits that Kinnunen does not teach every element of presently amended Claim 39, and the reference does not anticipate the invention defined by this claim.

### Rejections Under 35 U.S.C. § 103

The Examiner has rejected Claims 30-32 and 34-36 under 35 U.S.C. 103(a) as being unpatentable over Mavroidis. The Examiner states that it would have been obvious to one of the ordinary skill in the art, upon seeing Mavroidis' device, to perform the recited method steps of the instant claims for a providing desired therapy.

Applicant has amended independent Claims 30-32 and 34-35, to positively recite the limitations wherein "the first movement can be performed independently of the second movement" (emphasis added). Applicant respectfully submits, per the discussion above, that

Application No.: 10/526,713  
Filing Date: 9/23/2005

Mavroidis fails to disclose an orthoses which is capable of moving more than one joint in a single limb. As noted previously, independent control of different joints in a limb or digit can be useful in therapy, and is achieved by the methods of certain embodiments of the present invention.

Applicant has amended independent Claim 36, to positively recite the limitation wherein the steps require "determining from the feedback signal a measurement" and "calculating from the measurement, the selected parameter." By contrast, the sensors of Mavroidis' device are used merely to provide feedback for control of the device, in a similar manner to several earlier methods of the present invention. In certain embodiments of the present invention, however, the device is used in order to measure an applied force, pressure or position applied by a joint of a patient for a purpose not merely to provide feedback control. Applicant respectfully submits that being able to use the device as a measuring device is not rendered obvious by Mavroidis.

For the above stated reasons, Applicant respectfully submits that Mavroidis does not render obvious the inventions defined by Claims 30-32 and 34-36.

The Examiner has rejected Claims 26, 30-32 and 34-35 under 35 U.S.C. 103(a) as being unpatentable over Cencer. The Examiner states that it would have been obvious to one of the ordinary skill in the art, upon seeing Cencer's device, to perform the recited method steps of the instant claims for providing a desired therapy.

For at least the same reasons discussed previously, Applicant respectfully submits that the presently amended claims have combination of characteristics not present or suggest in Cencer. As noted above, the presently amended claims require the independent movements of multiple joints in a single limb or digit. By contrast, Cencer fails to provide the facility to control or facilitate separate joints independently in a single limb or digit. Accordingly, the device of Cencer would be incapable of performing the methods described in the above referenced claims.

Applicant respectfully submits that Claims 26, 30-32 and 34-35 are not rendered obvious by Cencer.

The Examiner has rejected Claims 13, 18 and 33 under 35 U.S.C. 103(a) as being unpatentable over Mavroidis as applied to Claims 1 -5, 8, 9, 20, 21, 23, 24, 26 to 29, and further

**Application No.: 10/526,713****Filing Date: 9/23/2005**

in view of Girard (US 4,167,044, hereinafter "Girard"). Examiner admits that Mavroidis is silent as to the specifics of the locking mechanism. For this, the Examiner relies on Girard, which the Examiner states discloses a mechanical locking means comprising a ratchet (54) for locking a movement facilitation device at a given angle.

Applicant respectfully submits that neither Mavroidis, Girard, nor the combination of the two, renders obvious the inventions in Claims 13, 18, and 33. Applicant notes, as discussed previously, that presently amended independent Claim 2, upon which Claims 13 and 18 depend, recite the limitation wherein "first movement can be performed independently of the second movement" (emphasis added). Similarly, presently amended independent Claim 33 recites the limitation wherein "movement of the first joint can be performed independently of movement of the second joint" (emphasis added). Because neither Mavroidis, Girard, nor the combination of the two teach such independent movement, as required by the claims, Applicant respectfully submits that the Claims be allowed for at least the same reasons stated above.

Notwithstanding the above, Applicant would also like to point out that there is no suggestion of "means to set a safety limit" as required by Claim 18 present in Girard nor in Mavroidis. Accordingly, the combination of these references would not render a device having such a safety limit means obvious. It appears however that the Examiner may be referring to Claim 17 rather than Claim 18, in that Claim 17 refers to a lock. Even so, Claim 17 is dependent on Claim 2.

Applicant respectfully submits that neither Mavroidis, Girard, nor the combination of the two, renders obvious the inventions in Claims 13, 18, and 33.

The Examiner has rejected Claims 14-16, 37, and 38 under 35 U.S.C. 103(a) as being unpatentable over Mavroidis as applied to Claims 1-5, 8, 9, 20, 21, 23, 24, 26 to 29, and further in view of Kinnunen. Examiner admits that Mavroidis is silent as to a force-position sensor comprising a radiation source and detector and a return mechanism. For these, the Examiner relies on Kinnunen, which the Examiner states discloses a force position sensor comprising a light source (4), a detector means, and a return mechanism (2) for measuring forces and displacements.

Application No.: 10/526,713  
Filing Date: 9/23/2005

Applicant notes, as discussed previously, that presently amended independent Claim 2, upon which Claims 14-16 depend, recite the limitation wherein "first movement can be performed independently of the second movement" (emphasis added). Accordingly, Claims 14-16 should be allowed for at least the same reasons discussed above. Namely, because neither Mavroidis, Kinnunen, nor the combination of the two, make obvious the independent movement feature required by Claim 2, upon which Claims 14-16 depend.

Applicant has presently amended Claims 37 and 38 to recite the limitation "wherein at least one detector is free to move relative to the radiation source" (emphasis added). As noted, when discussing a similar amendment to Claim 39, above, in certain embodiments of the present invention, the detectors can move relative to the radiation source. Advantageously, as a result of this movable configuration, in certain embodiments of the present invention, the transducer is capable of measuring the position of a joint and of a force applied by or on the joint as separate independent parameters.

Applicant respectfully submits that neither Mavroidis, Kinnunen, nor the combination of the two, renders obvious the inventions in Claims 14-16, 37, and 38.

With the present amendments, Applicant respectfully submits that the instant application has been placed in a condition ready for allowance. Favorable action is requested.

No Disclaimers or Disavowals

Although the present communication may include alterations to the application or claims, or characterizations of claim scope or referenced art, the Applicants are not conceding in this application that previously pending claims are not patentable over the cited references. Rather, any alterations or characterizations are being made to facilitate expeditious prosecution of this application. The Applicants reserve the right to pursue at a later date any previously pending or other broader or narrower claims that capture any subject matter supported by the present disclosure, including subject matter found to be specifically disclaimed herein or by any prior prosecution. Accordingly, reviewers of this or any parent, child or related prosecution history shall not reasonably infer that the Applicants have made any disclaimers or disavowals of any subject matter supported by the present application.

Application No.: 10/526,713  
Filing Date: 9/23/2005


RECEIVED  
CENTRAL FAX CENTER  
JAN 23 2008

Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated: 1/23/08

By:   
Thomas R. Arno  
Registration No. 40,490  
Customer No. 20,995

(949) 760-0404

4728396  
010808